

Vivekananda Global University, Jaipur

Semester I

BCA (Computer Science & Applications)

MAT 195: BASIC MATHEMATICS

3L+1T+0P+3.5C

MM:100

Module 1: DETERMINANTS: Definition, Minors, Cofactors, Properties of Determinants Matrices: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Cramers Rule, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Caley-Hamilton Theorem (without proof).

Module 2: LIMITS, CONTINUITY & DIFFERENTIATION- Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over an Interval, Intermediate Value Theorem, Type of Discontinuities. Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions.

Module 3: QUADRATIC EQUATIONS- Definition of polynomial in one variable with example, Standard form of a quadratic equation $ax^2+bx+c=0$, $a \neq 0$, Solution of quadratic equation(only real roots) by factorization, By completing the square and by using quadratic formula, Relationship between discriminant and nature of roots..

Module 4: STATISTICS- Frequency distribution, Graphical representation of frequency distribution. Mean, Median, Mode and other measures of Central Tendency, Dispersion, Standard Deviations, Variance, Correlation and regression, Measure of Karl's Pearson's coefficient of correlation, Regression analysis, Properties of regression lines.

Module 5: VECTOR ALGEBRA: Definition of a vector in 2 and 3 Dimensions; Double and Triple Scalar and Vector Product and physical interpretation of area and volume.

Text/Reference Books:

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001.
4. Shanti Narayan, "Differential Calculus", S.Chand & Company, 1998.
5. Mathematics XI &XII, R.D. Sharma, Dhanpat Rai Publications.
6. Probability,Statistics and Queueing theory:Allen.

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Semester I

BCA (Computer Science & Applications)

BCA 101 : FUNDAMENTALS OF C

3L+1T+0P+3.5C

MM:100

Module 1: INTRODUCTION:-What is a program? What is a programming language? Steps in Programming, Skills needed to do programming, A little introduction to C, Writing a Program, Fundamentals of a Programming Language, Different Programming Techniques, Procedural Programming, Modular Programming, Object Oriented Programming, Getting started with compiler. Words and Sentences in C Language: Alphabets in C, Keywords in C, Rules of forming Words in C language, Data Variables, Data Types and Rules for naming and declaring data, variables, Basic Data Types in C, Constants, Comments in C

Module 2: INSTRUCTIONS AND RULES FOR WRITING:-Types of instructions, Data Manipulation Instructions, Input/Output Instructions, Flow Control Instructions: Decision Control Instructions, If, if-else, If-else-if, Nested if-else, Loop Control Instructions, For Loop, While Loop, Do While, Selection Instructions **Arrays:** What is an array? Array Declaration, Array Initialization, Accessing individual elements of an array, Two Dimensional Arrays, Passing an array element to a function, Rules of using an array

Module 3: FUNCTIONS:-Why use Functions, Components of Function, Name of a function, Body of a function, Local variables of a function, Parameters or Arguments to a function, Return Values, Prototype of a function

Module 4: POINTERS:-What is a pointer? Declaring a Pointer variable, initializing a pointer variable, Using a Pointer Variable, Pointer Arithmetic, Pointers and array, passing an entire array to a function, Strings: What are strings? String I/O, String Manipulation Functions

Module 5: STRUCTURES:-Declaring and Accessing Structure, variables Uses of Structures, Unions Storage Classes and Scoping: Automatic, Register, External, Static, Scope of a Variable File Input/output: Command-line arguments, File Input and Output, Combining Command-line Arguments and File I/O.

Text/Reference Books:

1. Brian W. Kernighan, Dennis M. Ritchie, "The C Programming Language"
2. K. N. King, "C Programming: A Modern Approach" Prentice-Hall
3. Stephen Prata, "C Primer Plus" published by Sams
4. Steve Oualline, "Practical C Programming" O'Reilly Media
5. Yashwant Kanetkar, "Let us C" BPB Publications
6. Yashwant Kanetkar, "Pointers in C" BPB Publications

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Semester I

BCA (Computer Science & Applications)

BCA 102 : OFFICE AUTOMATION TOOLS

3L+0T+0P+3C

MM:100

MODULE 1:-Brief history of development of computers, Computer system, concepts, Computer system characteristics, Capabilities and limitations, Types of computers Generations of computers, Personal Computer (PCs) – evolution of PCs, configurations of PCs- Pentium and Newer, PCs specifications and main characteristics. Basic components of a computer system - Control unit, ALU, Input/output functions and characteristics, memory - RAM, ROM, EPROM, PROM and other types of memory.

Computer software and its types, Programming languages - Machine, assembly and high level, Language translators, Overview of the Digital Computer System - Processor, Memory, Input and Output Devices, Storage Devices, Operating Systems, Application Software, Types of Computers.

MODULE 2:-Input/Output & Storage Units:-Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Monitors - characteristics and types of monitor -Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non Interlaced, Dot Pitch, Video Standard - VGA, SVGA, XGA etc, Printers& types - Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers

MODULE 3:-Software and its Need, Types of Software - System software, Application software, System Software - Operating System, Utility Program, Programming languages, Assemblers, Compilers and Interpreter, Introduction to operating system for PCs-DOS Windows, Linux, File Allocation Table (FAT & FAT 32), files & directory structure and its naming rules, booting process details of DOS and Windows, DOS system files.

Internet Applications: Internet, Internet Applications, e-Mail, IRC, Web Surfing, Web Browsers, Search Engines, Internet Service Providers, Downloading, Audio and Video Conferencing. Security issues in Internet – Bugs, Viruses, Anti-viruses, and Firewalls etc. Internet threats to the society, Cyber laws and Legal issues

MODULE 4:- Editors and Word Processors: Basic Concepts, Notepad, Word-pad, MS-Word, Basic Functions of MS Word, Desktop publishing, open source word processing software

MODULE 5: Spreadsheets and Database packages: Purpose, usage, command, MS-Excel, Creation of files in MS-Access, Switching between application, MS-PowerPoint

Text/Reference Books:

1. Leon, Alexis Et al“Introduction to Computers” Vikas Publishing House
2. Dr. Durgesh Pant, Mahesh Kumar Sharma, “Fundamentals of Information Technology”
3. V. Rajaraman, “Introduction to Information Technology “Prentice- Hall of India
4. Ritchie & Kernighan, The C Programming language, 2nd Ed., PHI.
5. Dey & Ghosh, Computer Fundamentals and programming in C, Oxford.

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Semester I

BCA (Computer Science & Applications)

BCA 103 : BASIC ELECTRONICS

3L+0T+0P+3C

MM:100

Module 1: Electric Current, Electromotive force, Electric Power, Ohm's Law, Basic Circuit Components, Faraday's Law of Electromagnetic Induction, Lenz's Law, Kirchhoff's laws, Network Sources, Resistive, Inductive and capacitive Networks, Series Parallel Circuits.

Module 2: Conduction in Semiconductors, Conduction Properties of Semiconductor Diodes, Behavior of the PN Junction, PN Junction Diode, Zener Diode, Photovoltaic Cell, Rectifiers, L, C, & L-C filters.

Module 3: Transistor, Modes of operation, Characteristics, Current components, Current gains: alpha, beta and gamma. CE, CB and CC configuration, Transistor as an Amplifier. Field Effect Transistor; JFET and MOSFET.

Module 4: Representation of Data: Digital versus Analog, Digital number system (binary, octal, decimal and hexadecimal numbers), Conversion from one form to another, fractional numbers and signed numbers, Complements, Arithmetic operations on binary numbers, Fixed point and floating point representations. Boolean algebra, Logic Gates and Their Truth Tables.

Module 5: Communication Systems: Introduction, IEEE Spectrum for Communication Systems, Types of Communication, Amplitude and frequency Modulation. Introduction to Transducers: Thermocouple, RTD, Strain Gauges, Load Cell.

Text / Reference Books:

1. Basic Electrical and Electronics Engineering by Sukhija and Nagsarkar, Oxford Publication
2. Basic Electrical & Electronics Engineering by Kothari, Nagrath, TMH
3. Electronic devices & circuits theory, R.L. Boylestad, Louis Nashelsky , Pearson education
4. Millman, Electronics Devices and Circuits, TMH
5. Basic Electronics Engineering by Vijay Baru et al, Dream Tech, New Delhi
6. Fundamentals of Electrical and Electronics Engineering by Ghosh, Smarajit, PHI India

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Semester I

BCA (Computer Science & Applications)

BCA 104 : PRINCIPLE OF PROGRAMMING LANGUAGES

3L+0T+0P+3C

MM:100

Module 1: PROGRAMMING LANGUAGE: Definition, History, Features. Issue in Language Design: Structure and Operation of computer, Language Paradigms, Efficiency, and Regularity. Issues in Language Translation: Syntax, Semantics, Stages analysis and synthesis.

Module 2: Specification and Implementation of Elementary and Structured Data Types, Type equivalence, checking and conversion. Array, Structure, Union.

Module 3: Sequence control with Expressions, Conditional Statements, Loops, Exception handling, Subprogram definition and activation, simple and recursive subprogram, subprogram environment, Parameter passing mechanism.

Module 4: Abstract Data type, information hiding, encapsulation, type definition, Static and Stack-Based Storage management. Fixed and Variable size heap storage management.

Module 5: PARALLEL PROGRAMMING: Introduction, parallel processing and programming language, Threads, semaphore, monitor, message passing.

Text/Reference Books:

1. Concepts of Programming Language, Robert W. Sebesta, Addison Wesley, Pearson Education Asia, 1999.
2. Introduction to Computer Science, Ramon A. Mata-Toledo and Pauline K. Cushman, Mc Graw Hill International Edition.
3. Programming Languages, D. Appleby and JJ Vande Kopple: Tata Mc Graw Hill, India.
4. How to Program C, Deitel and Deitel, Addison Wesley, Pearson Education Asia, 1999.

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Semester I

BCA (Computer Science & Applications)

BCA 105 : FUNDAMENTAL OF C LAB

0L+0T+4P+2C

MM:100

Basic Calculation:

1. Write a c program to display your Name, address and city in different lines.
2. Write a c program to perform all airthmatic operations.
3. Write a c program to convert the Fahrenheit into centigrade. Formula $c = (F-32)/1.8$
4. Write a c program to calculate the simple interest.
5. Write a c program to calculate the compound interest.
6. Write a program in C to display sum of first N natural numbers.
7. Write a c program to find the roots of the quadratic equation.

Conditional Statements

1. Write a C – program which used to determine type of triangle based on sides. Measure of sides input by the user. To check whether the triangle is isosceles, scalene or equilateral triangle. Hint: If all the sides are equal than equilateral, If any two sides are equal than isosceles otherwise scalene.
2. Write a program in C to which allow user to enter any arithmetic operator (+ - * /) and two integer values and display result according to selection of operator.
3. Write a program in C to calculate gross salary of employee using : 1. Gross Salary = Basic Pay + DA + HRA – PF. 2. DA = 30% If Basic Pay < 5000 otherwise DA = 45% of the Basic Pay. 3. HRA = 15% of Basic Pay. 4. PF = 12% of Basic Pay. Only basic pay will input by the user. Display Gross salary – DA – HRA – PF and basic salary
4. Student should fulfill the following criteria for admission: Mathematics ≥ 50 Physics ≥ 45 Chemistry ≥ 60 Total of all subject ≥ 170 OR Total of Mathematics + Physics ≥ 120 Accept the marks of all the three subjects from the user and check if the student is eligible for admission.
5. Write a program in C for grade calculation using if...else if ladder and switch Statement. Accept marks of 3 subjects calculate total and based on it calculate Grade.

Loop Programs

1. Program to display first N prime numbers. N is input by the user.
2. Program to display A to Z in upper case or lower case according to user selection.
3. Program which used to print A to Z and Z to A.
4. Program which ask for party to user until the user say yes (Using While)
5. Program which ask for party to user until the user say yes (Using Do While)
6. Program which check that whether the given number is palindrome or not.
7. Program to check that the given number is Armstrong or not.
8. Program which will display next nearest prime number of given integer number. For example next nearest prime of 5 is 7, for 8 is 11, for 7 is 11 (Using Do while)

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Semester I

BCA (Computer Science & Applications)

BCA 106 : PC SOFTWARE & AUTOMATION LAB

0L+0T+4P+2C

MM:100

List of Practicals

1. Given a PC, name its various components and list their functions
2. Identification of various parts of a computer and peripherals
3. DOS Basic Commands
4. Exercises on entering text and data (Typing Practice)
5. Installation of Windows Operating System using pendrive, CD & Virtual Machine
6. MS-WORD
 - a. File Management: Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, giving password protection for a file
 - b. Page set up: Setting margins, tab setting, ruler, indenting
 - c. Editing a document: - Entering text, Cut, copy, paste using tool- bars
7. Work books:
 - a. Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula, creation and links, controlling calculations, working with arrays
 - b. Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet.
 - c. Creating a chart:-Working with chart types, changing data in chart, formatting a chart, use chart to analyze data
8. MS-Excel:-
 - a. How to change view of worksheet, outlining a worksheet, customize workspace, using templates to create default workbooks, protecting work book
 - b. Exchange data with other application: linking and embedding, embedding objects, linking to other applications, import, and export document.
9. Internet and its Applications
 - (a) Log-in to internet
 - (b) Navigation for information seeking on internet
 - (c) Browsing and down loading of information from internet
 - (d) Sending and receiving e-mail

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Semester I

BCA (Computer Science & Applications)

ENG 115 : SOFT SKILL & PROFESSIONAL APTITUDE

0L+0T+2P+1C

MM:100

MODULE: 1- INTERPERSONAL RELATIONSHIP MANAGEMENT- Importance & Benefits of IPR, Developing Interpersonal Abilities, Team Building- Definition and Types, Team work skills, Qualities of a Team Player, Leadership- Understanding the qualities of a Good Leader, 4 Factors of Leadership, Bring out the Leader in You

MODULE: 2- RESUME WRITING- Concepts of Resume, Curriculum Vitae and Bio-data, Resume – Information and Details, Sample Resume and Template, Cover Letter- Cover letter Writing, Sample Cover letter and Template

MODULE: 3 -PERSONAL GROOMING AND INTERVIEW ETIQUETTE- Basic Personal Hygiene, Professional Attire – Men& Women, Interview Etiquette Guide, Telephonic Interview- Importance and Preparation, Advantages and Disadvantages, Things to Remember, Video Interview- Preparation and Practice, Guide to a Successful Video Interview, Importance and Types of Personal Interviews, FAQs with Answers

MODULE: 4 - GROUP DISCUSSION- Group Discussion Guide, Topics for Group Discussion, Mock GD

MODULE: 5 –EXTEMPORE- Guide to Successful Extempore, Extempore Topics, Practice Session

Text/Reference Books:

1. Business communication Design, Angell, Pamela, Mcgraw-Hill, New York.
2. Grammar Finder, Eastwood, John, Oxford university press.
3. Effective technical communication, Mitra, K. Barun, Oxford university press.
Communicate to conquer: A handbook of group discussion and interviews, PHI learning, New Delhi.

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Semester I

BCA (Computer Science & Applications)

MGT 201 : ORIENTATION PROGRAM IN ENTREPRENEURSHIP

0L+0T+2P+1C

MM:100

OBJECTIVE: The goal of this programme is to inspire students and help them imbibe an entrepreneurial mindset. Student will learn what entrepreneurship is and how it has impacted the world and their country. They will introduce to the key traits and the DNA of an entrepreneur. This certificate program focuses on a specific Entrepreneurial knowledge or skill requirement such as creative thinking, communication, risk taking and resilience.

Module 1:

Entrepreneurship; Concept, functions, Need, Characteristics and competency. How has entrepreneurship change the world? Process of Entrepreneurship development , Idea Generation exercises.

Module 2:

Entrepreneurial DNA, Traits Gaps and Gap Analysis. Relevance of Entrepreneurship in Socio-Economic development. Barriers to Entrepreneurship. Case studies.

Module 3:

Entrepreneurial Pursuits and Human Activities; nature, purpose and pattern of Human activities: Economic and non-economic, need for innovation. Creativity. Case studies

Module 4:

Entrepreneurial Values, Attitudes and Motivation-Meaning and concept. Developing entrepreneurial Motivation -concept and process of achievement motivation. Leadership, Communication and influencing ability. Success stories.

Module 5:

Enterprise and Environment : Environmental function, Critical factors for launching of a new enterprise, Understanding a market, Competitive analysis of the market.

Suggested Readings:

Online course through massive open online classes (MOOC), classroom learning through an experienced facilitator/faculty on campus (games, video, and practical experience

1. Vasanta Desai: Dynamics of entrepreneurial development and management;
2. Vasanta Desai: Entrepreneurial development;
3. Peter F. Drucker: Innovation and development;
4. M.V. Deshpande: Entrepreneurship of small scale industries;
5. Balakrishnan, G. Financing of small scale industries.

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Semester II

BCA (Computer Science & Applications)

MAT 107 : DISCRETE MATHEMATICAL STRUCTURES

3L+1T+0P+3.5C

MM:100

Module 1: FORMAL LOGIC - Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, Logic Programming and Proof of correctness.

Module 2: PROOF, RELATION AND ANALYSIS OF ALGORITHM TECHNIQUES FOR THEOREM PROVING - Direct Proof, Proof by Contra position, Proof by exhausting cares and proof by contradiction, principle of mathematical induction, principle of complete induction. Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients.

Module 3: GRAPH THEORY - Graphs - Directed and Undirected, Eulerian chains and cycles Hamiltonian chains and cycles, Trees, chromatic number, connectivity and other graphical parameters Applications. Polya's Theory of enumeration and its applications.

Module 4: SETS AND FUNCTIONS - Sets, relations, functions, operations, equivalence relations, relation of partial order, partitions, binary relations. Transforms: Discrete Fourier and Inverse Fourier Transforms in one and two dimensions, discrete Cosine transform.

Module 5: MONOIDS AND GROUPS - Groups, Semi groups and Monoids cyclic semi graphs and sub monoids, Subgroups and cosets. Congruence relations on semi groups. Morphism, Normal sub groups. Structure off cyclic groups, permutation groups and dihedral groups elementary applications in coding theory.

Text/Reference Books:

1. Richard johnsonbaugh disvrete mathematics prearson Asia 2001 .
2. John Truss: Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.
3. Robert J.Mc Eliece: Introduction to Discrete Mathematics, Tata Mc. Graw Hill, India.
4. Lipschutz: Discrete Mathematics, Tata Mc. Graw Hill India.
5. Kenneth H. Rosen, Discrete mathematics and Applications, Tata Mc. Graw Hill

Module 1: Different paradigms for problem solving, need for OOP, differences between OOP and Procedure oriented programming, Abstraction, Overview of OOP principles, Encapsulation, Inheritance and Polymorphism.

Module 2: C++ BASICS: Structure of a C++ program, Data types, Declaration of variables, Expressions, Operators, Operator Precedence, Evaluation of expressions, Type conversions, Pointers, Arrays, Pointers and Arrays, Strings, Structures, References. Flow control statement- if, switch, while, for, do, break, continue, goto statements. Functions-Scope of variables, Parameter passing, Default arguments, inline functions, Recursive functions, Pointers to functions.

Module 3: Dynamic memory allocation and de-allocation operators-new and delete, Preprocessor directives. C++ Classes And Data Abstraction: Class definition, Class structure, Class objects, Class scope, this pointer, Friends to a class, Static class members, Constant member functions, Constructors and Destructors, Dynamic creation and destruction of objects, Data abstraction, ADT and information hiding.

Module 4: POLYMORPHISM - Function overloading, Operator overloading, Generic programming necessity of templates, Function templates and class templates. Inheritance: Defining a class hierarchy, Different forms of inheritance, Defining the Base and Derived classes, Access to the base class members, Base and Derived class construction, Destructors, Virtual base class.

Module 5: VIRTUAL FUNCTIONS AND POLYMORPHISM - Static and Dynamic bindings, Base and Derived class virtual functions, Dynamic binding through virtual functions, Virtual function call mechanism, Pure virtual functions, Abstract classes, Implications of polymorphic use of classes, Virtual destructors.

Text/Reference Books:

1. Problem solving with C++, The OOP, 4th Edition, Walter Savitch, Pearson Education.
2. C++, The Complete Reference, 4th Edition, Herbert Schildt, TMH.
3. C++ Primer, 3rd Edition, S.B.Lippman and J.Lajoie, Pearson Education.
4. The C++ Programming Language, 3rd Edition, B.Stroutstrup, Pearson Education.
5. Object Oriented Programming in C++, 3rd Edition, R.Lafore, Galigotia Publications pvt ltd.

Module 1: INTRODUCTION TO DATA STRUCTURES - Definition of data structures and abstract data types. Static and Dynamic implementations. Examples and real life applications, Data Structures: Arrays, Address calculation in a single and multi dimensional array. Sparse matrices

Module 2: STACKS, QUEUES AND LISTS - Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples: Infix, postfix, prefix representation, Applications: Mathematical expression Evaluation Definition: Queues & Lists: Array based implementation of Queues / Lists, Linked List implementation of Queues / Lists, Circular implementation of Queues and singly linked Lists, Straight / circular implementation of doubly linked Queues / Lists, Priority queues, Applications

Module 3: TREES & GRAPHS - Definition of trees and Binary trees, Properties of Binary trees and Implementation, Binary Traversal - preorder, post order, in order traversal, Binary Search Trees, Implementations, Threaded trees, Balanced multi way search trees, AVL Trees, Implementations, Applications Definition of Undirected and Directed Graphs and Networks, The Array based implementation of graphs, Adjacency matrix, path matrix implementation, The Linked List representation of graphs, Shortest path Algorithm, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Connected components of graphs, Weighted Graphs, Applications.

Module 4: SORTING SEARCHING ALGORITHMS - Introduction, Sorting by exchange, selection, insertions, Bubble sort, Selection sort, Insertion sort, Pseudo code algorithm and their C++ implementation, Efficiency of above algorithms, Shellsort, Performance of shell sort, Merge sort, Merging of sorted arrays, The merge sort Algorithms, Quick sort Algorithm.

Module 5: ANALYSIS OF QUICK SORT, PICKING A PIVOT - A partitioning strategy, Heap sort, Heap Construction, Heap sort, bottom – up, Top – down Heap sort approach, Radix sort, Straight Sequential Search, Array implementations, Linked List representations, Binary Search, non – recursive Algorithms, recursive Algorithms, Indexed Sequential Search

Text/Reference Books:

1. Theory & Problems of Data Structures by Jr. Seymour Lipschetz, Schaum's outline by TMH
2. Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
3. Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
4. Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983, AW

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Semester II

BCA (Computer Science & Applications)

BCA 203 MANAGEMENT INFORMATION SYSTEM

3L+0T+0P+3C

MM: 100

Module 1: MANAGING INFORMATION SYSTEMS IN ORGANIZATION: Introduction, Definition, Need of MIS, Managing in the Internet Era, Managing Information Systems in Organization-the IT interaction model, Challenges for the manager-what information to build?-how much to spend on information systems?-what level of capabilities should be created with information systems?-how centralized should the services be?-what security levels are required?-what is technology road map for the organization?

Module 2: DATA AND INFORMATION: Introduction, data and information- measuring data, information as a resource, information in organizational functions, types of information technology, types of information systems- transaction processing systems-management information systems

Module 3: DECISION MAKING AND COMMUNICATION: Introduction, Decision making with MIS-Tactical decisions-operational decisions-strategic decisions, communication in organizations- types of communication- examples of communications in organizations- decision making with communication technology, Decision Support Systems: Introduction, Understanding DSS- MIS and DSS-Decision making-types of decisions, Analytics and Business Intelligence- BI techniques

Module 4: SCM, CRM AND INTERNATIONAL SYSTEMS: Introduction, Supply Chain Management Systems, Customer Relationships Management Systems, Challenges of Enterprise Systems Implementations- Managing the implementation, International Information Systems- Outsourcing and off-shoring

Module 5: MANAGING SOCIAL MEDIA: Introduction, Social Dynamics of the Internet, Services of the Internet- Blogs-Social Networks, Technology of the Internet- Twitter-Rating-Tagging/folksonomies, Social issues-Media impact-Collaboration-Emergence of order, Social Networks in the Enterprise Managing IT Function: Introduction, Challenges of Managing the IT function- Modern IT environment-Centralization versus Decentralization-IT security-Technology selection, Vendor Management- vendor selection-vendor contracts and service levels-Ongoing relationship management- vendor retention or termination

Text/Reference Books:

1. Management Information Systems, Jawadekar, Tata McGraw Hill
2. Management Information Systems, Davis and Olson, Tata McGraw Hill
3. Analysis and Design of Information Systems, Rajaraman, Prentice Hall

Module 1: INTRODUCTION TO E-COMMERCE: The Scope of Electronic Commerce, Definition of Electronic Commerce, Electronic E-commerce and the Trade Cycle, Electronic Markets, Electronic Data Interchange, Internet Commerce, E-Commerce in Perspective.

Business Strategy in an Electronic Age: Supply Chains, Porter's Value Chain Model, Inter Organizational Value Chains, Competitive Strategy, Porter's Model, First Mover Advantage Sustainable Competitive Advantage, Competitive Advantage using E-Commerce, Business Strategy, Introduction to Business Strategy, Strategic Implications of IT

Module 2: BUSINESS-TO-BUSINESS ELECTRONIC COMMERCE: Characteristics of B2B EC, Models of B2B Ec, Procurement Management Using the Buyer's Internal Marketplace, Just in Time Delivery, Other B2B Models, Auctions and Services from Traditional to Internet Based EDI, Intergration with Back-end Information System, The Role of Software Agents for B2B EC, Electronic marketing in B2B, Solutions of B2B EC, Managerial Issues, Electronic Data Interchange (EDI), EDI: The Nuts and Bolts, EDI & Business.

Module 3: INTERNET AND EXTRANET : Automotive Network Exchange, The Largest Extranet, Architecture of the Internet, Intranet and Extranet, Intranet software, Applications of Intranets, Intranet Application Case Studies, Considerations in Intranet Deployment, The Extranets, The structures of Extranets, Extranet products & services, Applications of Extranets, Business Models of Extranet Applications, Managerial Issues.

Electronic Payment Systems : Is SET a failure, Electronic Payments & Protocols, Security Schemes in Electronic payment systems, Electronic Credit card system on the Internet, Electronic Fund transfer and Debit cards on the Internet, Stored – value Cards and E- Cash, Electronic Check Systems, Prospect of Electronic Payment Systems, Managerial Issues.

Module 4: PUBLIC POLICY: FROM LEGAL ISSUES TO PRIVACY : EC- Related Legal Incidents, Legal Incidents, Ethical & Other Public Policy Issues, Protecting Privacy, Protecting Intellectual Property, Free speech, Internet Indecency & Censorship, Taxation & Encryption Policies, Other Legal Issues: Contracts, Gambling & More, Consumer & Seller Protection In EC.

Module 5 : INFRASTRUCTURE FOR EC : It takes more than Technology, A Network Of Networks, Internet Protocols, Web- Based client/ Server, Internet Security, selling on the web, Chatting on the Web, Multimedia delivery, Analyzing Web Visits, Managerial Issues.

Reference Books:

1. David Whiteley, "E-Commerce", Tata McGraw Hill, 2000
2. Eframi Turban, Jae Lee, David King, K. Michale Chung, "Electronic Commerce", Pearson Education,

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Semester II

BCA (Computer Science & Applications)

BCA 205: OBJECT ORIENTED PROGRAMMING LAB WITH C++

0L+0T+4P+2C

MM:100

1. Create a user defined function (any) and use it inside the program.
2. Implement “call by value” & “call by reference “ function call techniques by using any user defined functions.
3. Implement the working of classes and objects by using any real world object.
4. Create a Stack object model in C++ & also make use of default and parameterized constructor to make the class more flexible in use.
5. Make all the member functions, including constructors, non-inline in the above class.
6. Create any user defined class using the concept of static data and member functions.
7. Create a Class or program implementing the concept of passing and returning object to/from member functions.
8. WAP to implement polymorphism through function overloading (Area of different shapes).
9. Create a user defined type Complex and do all the Complex number arithmetic. And also make use of operator overloading.
10. Implement single level inheritance by using Student and Marks class.
11. Implement multilevel inheritance by using the Stack class.
12. Demonstrate the calling mechanism of constructors and destructors in Multilevel Inheritance.
13. Create generic Stack model for storing different types of data.
14. Create a user defined type Matrix and perform all matrix operations. Also make use of operator overloading.
15. Implement the concept of Abstract classes and virtual functions by using Shape, Rectangle and Triangle class.

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Semester II

BCA (Computer Science & Applications)

BCA 206 : DATA STRUCTURE LAB

0L+0T+4P+2C

MM:100

1. Program on array searching, sorting (Bubble sort, Quick sort, Merge sort etc.)
2. Program to insert element at desire position, replacing element, deletion in array.
3. Various matrices operations.
4. Various strings programs.
5. Implementation of stack and queue using array
6. Implementation of stack and queue using link lists
7. Implementation of circular queue using link lists.
8. Polynomial addition, multiplication.
9. Two-way link lists programs.
10. Infix to postfix/prefix conversion.
11. BST implementation (addition, deletion, searching).
12. Stack ADT (array implementation) Implementing basic operation of stack (push, pop) using array implementation

Vivekananda Global University, Jaipur

Semester II

BCA (Computer Science & Applications)

MGT 110 : GENERAL APTITUDE

0L-0T-2P+1C

MM 100

MODULE-1 LEVEL 1:- Number System:-Number Series, HCF and LCM of Numbers, Fractions and Decimals, Square Root and Cube Roots, Indices and Surds, Simplification and Approximation,

MODULE-2-LEVEL-2 Problems on Ages and Numbers Percentage, Profit, Loss and Discount, Average, Ratio and Proportion, Time, Work and Wages, Pipes and Cisterns, Simple Interest, Compound Interest,

MODULE-3-LEVEL-3 Growth and Depreciation, Time and Distance, Trains, Boats and Streams, Races, Clocks, Calendar

MODULE-4: LEVEL-4: Area of Plane Figures, Volume and Surface Area of Solid Figures Elementary Algebra, Linear Equations, Quadratic Equations and In-equation, Progression,

MODULE-5: LEVEL-5: Permutation and Combination, Probability, Geometry, Trigonometry, Data Interpretation, Data Sufficiency

Text/Reference Books:

1. R. S. Agarwal- Aptitude Mathematics
2. Mathuria- Quake Mathematics

Vivekananda Global University, Jaipur

Semester II

BCA (Computer Science & Applications)

MGT 202 : BASIC PROGRAM IN ENTREPRENEURSHIP

0L+0T+2P+1C

MM:100

Objective: The goal of this Program is to provide a space and platform for discovery, both self – discovery and opportunity discovery. Students will discover their strengths in terms of an entrepreneurial founding team and learn basics such as opportunity discovery, prototyping, business plans, challenges etc.

Module 1: Identification and classification of ideas. Entrepreneurial opportunities, environment scanning, Market assessment.

Module 2: Clarifying the Value Proposition, Product and Service; Market segmentation, Product Life cycle; BCG Matrix.

Module 3: Environmental Scanning and SWOT analysis; Components of an ideal business plan – market plan, financial plan, operational plan, and HR plan.

Module 4: Concept to Creation, Teething Problems of startup, Organizing and Marketing a Startup Selling on the web, launching e-commerce , Starting and growing an Enterprise, Growth Path

Module 5: Students have to prepare a detailed business plan selecting a product(s), Presentation of such business plans and submission after necessary corrections suggested by subject faculty

References:

Online Courses through MOOC, Classroom learning through an experienced Facilitator/Faculty on campus (Games, Exercises, Videos, and Practical Experiences)

1. Tendon ,C: Environment and Entrepreneur; Cliugh Publications, Allahabad.
2. Siner A David: Entrepreneurial Megabuks; John Wiley and Sons, New York.
3. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.
4. Prasanna Chandra: Protect Preparation, Appraisal, Implementation; Tata McGraw Hill. New Delhi.
5. Paudey I.M: Venture Capital - The Indian Experience; Prentice Hall of India. New Delhi
6. Holt: Entrepreneurship-New Venture Creation; Prentice Hall of India. New Delhi

Vivekananda Global University, Jaipur

Semester III

BCA (Computer Science & Applications)

BCA 301 : DATABASE MANAGEMENT SYSTEM

3L+0T+0P+3C

MM:100

Module 1: INTRODUCTION - Database Systems versus File Systems, View of Data, Data Models, database languages, Database Users and Administrators. Transaction Management, Decision Support Systems, Components of a Database management System. Distributed Processing and Client- Server Architecture. Entity-Relationship Model – Basic Concepts, Constraints, Keys, Design Issues, E-R Diagrams.

Module 2: RELATIONAL MODEL - Structures of relational databases, Integrity Constraints, Logical database Design, Tables, Views, Data Dictionary. Relational Algebra, Relational Calculus. SQL – Basic Structures, Query Handling, Embedded SQL, Open Database Connectivity (ODBC), Java Database Connectivity (JDBC), Triggers, Security and Authorization. Query By Example (QBE), User Interfaces and Tools, Forms and Graphical User Interfaces. Report Generators. Overview of Relational Query Optimization.

Module 3: RELATIONAL DATABASE DESIGN - Functional Dependencies, Multi-valued Dependencies, Normal Forms, Decomposition into Normalized Relations, Physical Database Design – File Structures. Object-Relational Databases – Nested Relations, Complex Data types, Object-Relational Features in SQL:1999.

Module 4: INTERNET DATABASES - World Wide Web, Client Side Scripting and Applets, Web Servers and Sessions, Services, Server Side Scripting. XML – Structure of XML Data, XML Document Schema, XQuery, Storage of XML Data, XML Applications.

Module 5: ADVANCED TOPICS - Fundamental Concepts of Transaction Management, XConcurrency Control, Recovery Systems, Data Analysis and OLAP. Introduction to Data Mining, Data Farming, Data Warehousing, Spatial and Geographic Databases, Temporal databases and Multimedia Databases.

Text / Reference Books:

1. Date C J, “ An Introduction to Database Systems”, Addison Wesley
2. Korth, Silbertz, Sudarshan,” Database Concepts”, McGraw Hill
3. Elmasri, Navathe, “Fundamentals of Database Systems”, Addison Wesley
4. O’Neil, Databases, Elsevier Pub.
5. Leon & Leon,”Database Management Systems”, Vikas Publishing House
6. Bipin C. Desai, “ An Introduction to Database Systems”, Gargotia Publications
7. Majumdar & Bhattacharya, “Database Management System”, TMH (14)
8. Ramkrishnan, Gehrke, “ Database Management System”, McGraw Hill
9. Kroenke, “ Database Processing Fundamentals , Design and Implementation” Pearson Education.
10. D.Ulman, “Principles of Database and Knowledge base System”, Computer Science Press.
11. Maheshwari Jain.’DBMS: Complete Practical Approach”, Firewall Media, New Delhi

Module I: INTRODUCTION: Introduction to software Engineering, Software characteristics, Software components, Software applications, Software Engineering Principles, Software metrics and measurement, monitoring and control. Software development life-cycle, Water fall model, prototyping model, Incremental model, Iterative enhancement Model, Spiral model.

Module II: SOFTWARE REQUIREMENT SPECIFICATION: Requirements Elicitation Techniques, Requirements analysis, Models for Requirements analysis, requirements specification, requirements validation.

Module III: SYSTEM DESIGN: DESIGN PRINCIPLES: Problem partitioning, abstraction. Top down and bottom up – design, structured approach. Functional versus object oriented approach of design, design specification, Cohesiveness and Coupling. Overview of SA/SD Methodology, structured analysis, data flow diagrams, extending DFD to structure chart.

Module IV: TESTING: Verification and validation, code inspection, test plan, test case specification. Level of testing: Unit, Integration Testing, Top down and bottom up integration testing, Alpha and Beta testing, System testing and debugging. functional testing, structural testing, Software testing strategies. Software Maintenance: Structured Vs. unstructured maintenance, Maintenance Models, Configuration Management, Reverse Engineering, Software Re-engineering

Module V: SOFTWARE PROJECT MANAGEMENT: Project planning and Project scheduling. Software Metrics: Size Metrics like LOC, Token Count, Function Count. Cost estimation using models like COCOMO. Risk management activities. Software Reliability and Quality Assurance: Reliability issues, Reliability metrics, reliability models, Software quality, ISO 9000 certification for software industry, SEI capability maturity model.

Text / Reference Books:

1. R.S. Pressman, Software Engineering: A Practitioner's Approach, McGraw-Hill, Ed 7, 2010.
2. P. Jalote, An Integrated Approach to Software Engineering, Narosa Publishing House, Edition 3, 2011.
3. R. Mall, Fundamentals of Software Engineering, Prentice-Hall of India, 3rd Edition, 2009.
4. I. Sommerville, Software engineering (9th edition), Addison Wesley, 2010

Vivekananda Global University, Jaipur

Semester III

BCA (Computer Science & Applications)

BCA 303 COMPUTER-NETWORKS

3L+0T+0P+3C

MM:100

Module 1: INTRODUCTION - OSI, TCP/IP and other networks models, Network Topologies WAN, LAN, MAN. Token Bus, Token Ring, FDDI, IEEE standards 802.2, 802.3 Hubs, Bridges, Routers Gateways, Transmission Media: Transmission of signals through twisted pair, Coaxial cable, optical fibre.

Module 2: II DATA LINK LAYER & MEDIUM ACCESS LAYER - Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window. Pure and slotted Aloha, Throughput analysis of pure and slotted Aloha.

Module 3: NETWORK LAYER - Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Network layer in the Internet: IPv4 & IPv6 Protocols. Congestion Control Algorithms.

Module 4: DATA TRANSMISSION - Terminology, Frequency, spectrum, bandwidth, analog and digital transmission, Transmission impairments.

Wireless Transmission: Antenna and antenna gain, introduction to terrestrial and satellite microwave, Propagation of wireless signals, free space loss for LOS communication.

Module 5: MULTIPLEXING – Introduction to FDM, TDM and CDM, **Multiple Accesses:** Performance of FDMA-FM-FDMA, Single channel per carrier. TDMA frame structure TDMA Frame efficiency, TDMA super frame structure.

Text/Reference Books:

1. Computer Network, Leon And Garcia, TMH
2. Data Communication And Networking(Sie), Forouzan, TMH
3. Computer Network, Tanenbaum, Pearson
4. Computer Networking, Kurose, Pearson
5. Computer Networking And Inernet, Halsell, Pearson
6. Digital Telephony, 3rd Ed, James Irvine & David Harle, Wiley

Vivekananda Global University, Jaipur

Semester III

BCA (Computer Science & Applications)

BCA 304 : INTERNET & WEB TECHNOLOGIES

3L+0T+0P+0C

MM : 100

Module 1: INTRODUCTION TO INTERNET : Introduction, Evolution of Internet, Internet Applications, Internet Protocol -TCP/IP, UDP, HTTP, Secure Http(https), Internet Addressing – Addressing Scheme – Ipv4 & IPv6, Network Byte Order, Domain, Name Server, and IP Addresses, Mapping, Internet Service Providers, Types Of Connectivity Such As Dial-Up, Broad band, WiFi

Module 2: HTML – Introduction, HTML tags, Dtd(Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards , Cascading Style Sheets: Syntax ,Class Selector, Approaches To Dynamic Pages: Cgi, Java Applets, Plug Ins, Active X

Module 3: JAVA SCRIPT – Java Script Object Model, Variables-Constant – Expressions, Conditions- Relational Operators, Data Types ,Flow Control, Functions & Objects-events and event handlers,

Module 4: XML- What is XML – Basic Standards, Schema Standards, Linking & Presentation Standards, Standards that build on XML, Generating XML data, writing a simple XML File

Module 5: Types of Viruses, Client Server Security Threats, Data & Message Security, Various electronic payment systems, Introduction to EDI, , Encrypted Documents and Emails, Firewalls: Hardened Firewall Hosts

Text/Reference Books:

1. Web Technology - N.P. Goplan, J.Akilandeswari
2. Internet Technology and Web Design - ISRD Group
3. HTML and Web designing - Kris Jamsa and Konrad King
4. HTML for Beginners - Firuza Aibava- Second Edition

Vivekananda Global University, Jaipur

Semester III

BCA (Computer Science & Applications)

BCA 305 : MULTIMEDIA SYSTEM

3L+0T+0P+3C

MM:100

Module 1: INTRODUCTION TO MULTIMEDIA - Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products and Stages of Multimedia Projects, Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools.

Module 2: Multimedia Building Blocks Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture.

Module 3: Data Compression Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modeling. Finite Context Modeling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression.

Module 4: Speech Compression & Synthesis Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression.

Module 5: IMAGES - Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file formatic animations Images standards, JPEG Compression, Zig-Zag Coding, Multimedia Database. Content based retrieval for text and images, Video: Video representation, Colors, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, recent development in Multimedia

Text/Reference Books:

1. Tay Vaughan "Multimedia, Making IT Work" Osborne TMH.
2. Buford "Multimedia Systems" Addison Wesley.
3. Agrawal & Tiwari "Multimedia Systems" Excel.
4. Sleinreitz "Multimedia System" Addison Wesley.

Module 1: INTRODUCTION - The .NET Solution, The Building Block of the .NET Platform (CLR,CTS, andCLS), The Role of the .NET Base Class Libraries, What C# Brings to the Table, An Overview of .NET Binaries (aka Assemblies), the Role of the Common Intermediate Language, The Role of .NET Type Metadata, The Role of the assembly Manifest, Compiling CIL to Platform – Specific Instructions, Understanding the Common Type System, Intrinsic CTS Data Types, Understanding the Common Language Specification, Understanding the Common Language Runtime A tour of the .NET Namespaces, Increasing Your Namespace Nomenclature, Deploying the .NET Runtime.

Module 2: BUILDING C# APPLICATIONS - The Role of the Command Line Compiler(csc.exe), Building C# Application using csc.exe Working with csc.exe, Response Files, Generating Bug Reports, Remaining g C# Compiler Options, The Command Line Debugger (cordbg.exe) Using the, Visual studio .NETIDE, Other Key Aspects of the VS.NET IDE, C# “Preprocessor:” Directives

Module 3: C# LANGUAGE FUNDAMENTALS - The Anatomy of Basic C# Class, Creating objects: Constructor Basics, The Composition of a C# Application, Default assignment and Variable Scope, The C# Member Initialization Syntax, Basic Input and Output with the Console Class, Understanding Value Types and Reference Types, The Master Node: System

Module 4: OBJECTS & METHODS- Object, The System Data Types(and C# Aliases), Converting Between Value Types and Reference Types: Boxing and Unboxing, Defining Program Constants, C# Iteration Constructs, C# Controls Flow Constructs, The Complete Set of C# Operators, Defining Custom Class Methods, Understating Static Methods, Methods Parameter Modifies, Array Manipulation in C#, String Manipulation in C#,C# Enumerations, Defining Structures in C#, Defining Custom Namespaces.

Module 5: OOPS WITH C#- Forms Defining of the C# Class, Default Public Interface of a Type, C#'s Encapsulation Services, Creating Read-Only Fields, C#'s Inheritance Supports, The “Protected” Keyword, Nested Type Definitions, The C #'s Polymorphic Support, Casting

Text/Reference Books:

1. A Programmer's Introduction to C#, 2nd edition, Apress - Eric Gunnerson
2. Inside C#, 2nd edition, Microsoft Press- Tom Archer
3. Component-Based Development with Visual C# , M&T books - Ted Faison
4. C# Essentials, 2nd edition O'Reilly - Ben Albahari, Peter Drayton & Brad Merrill
5. C# 5.0 In a Nutshell: The Definitive Reference - Joseph Albahari & Ben Albahari

BCA 307 PROGRAMMING IN PYTHON

3L+0T+0P+3C

MM: 100

Module 1: INTRODUCTION & OVERVIEW: - Introduction, What is Python, Origin, Comparison, Comments, Operators, Variables and Assignment, Numbers, Strings, Lists and Tuples, Dictionaries, if Statement, while Loop, for Loop and the range, Built-in Function, Files and the open() Built-in Function, Errors and Exceptions, Functions, Classes, Modules.

Syntax & styles: Statements and Syntax, Variable Assignment, Identifiers, Basic Style Guidelines, Memory Management, Python Application Examples.

Module 2: PYTHON OBJECTS:- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types.

Module 3: NUMBERS AND STRINGS:- Introduction to Numbers, Integers, Floating Point Real numbers, Complex Numbers, Operators, Built-in Functions. Sequences: Strings, Lists, and Tuples, Sequences, Strings, Strings and Operators, String-only Operators, Built-in Functions, String Built-in Methods, Special Features of Strings.

Module 4: LISTS:- Operators, Built-in Functions, List Type Built-in Methods, Special Features of Lists, Tuples, Tuple Operators and Built-in Functions, Special Features of Tuples.

Conditionals and Loops:-if statement, else Statement, else if Statement, while Statement, for Statement, break Statement, continue Statement, pass Statement, else Statement.

Module 5: FILES AND INPUT/OUTPUT:- File Objects, File Built-in Function, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules

Text/Reference Books:

1. Core Python Programming, Chun, J Wesley, 2nd Edition, Pearson,2010
2. Head First Python, Barry, Paul, 2nd Edition, O Rielly, 2010.
3. Learning Python, Lutz, Mark, 4th Edition, O Rielly, 2009.

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Semester III

BCA (Computer Science & Applications)

BCS 308 : DATABASE MANAGEMENT SYSTEM LAB

0L+0T+4P+2C

MM:100

Student can use My Sql (preferred open source DBMS) or any other Commercial DBMS tool (MS-Access / ORACLE) at backend and C++ (preferred) VB/JAVA at front end.

1. (a) Write a C++ program to store students records (roll no, name, father name) of a class using file handling.(Using C++ and File handling).

(b) Re-write program 1, using any DBMS and any compatible language.(C++/MySQL) (VB and MS-Access)

2. Database creation/ deletion, table creation/ deletion.

(a) Write a program to take a string as input from user. Create a database of same name. Now ask user to input two more string, create two tables of these names in above database.

(b) Write a program, which ask user to enter database name and table name to delete. If database exist and table exist then delete that table.

3. Write a program, which ask user to enter a valid SQL query and display the result of that query.

4. Write a program in C++ to parse the user entered query and check the validity of query. (Only SELECT query with WHERE clause)

5 - 6. Create a database db1, having two tables t1 (id, name, age) and t2 (id, subject, marks).

(a) Write a query to display name and age of given id (id should be asked as input).

(b) Write a query to display average age of all students.

(c) Write a query to display mark-sheet of any student (whose id is given as input).

(d) Display list of all students sorted by the total marks in all subjects.

7 - 8. Design a Loan Approval and Repayment System to handle Customer's Application for Loan and handle loan repayments by depositing installments and reducing balances.

9 -10. Design a Video Library Management System for managing issue and return of Video tapes/CD and manage customer's queries.

Vivekananda Global University, Jaipur

Semester III

BCA (Computer Science & Applications)

BCA 309 : SOFTWARE ENGINEERING LAB

0L+0T+4P+2C

MM:100

In this lab first 8 experiments are to practice software engineering techniques. Use any open source CASE tool. Many of them are available at www.sourceforge.net. You can choose any other CASE tool, as per choice.

Language: C++ / JAVA Design Approach : Object Oriented

These designing can be done on any automation system e.g. library management system, billing system, payroll system, bus reservation system, gas agency management system, book-shop management system, students management system.

1. Do feasibility study?
2. Document all the requirements as specified by customer in Software Requirement Specification
3. Design sequence diagrams for project
4. Design Collaboration diagram
5. Design Data Flow Diagram for the project
6. Design Entity Relation Diagram for the project
7. Design Class diagram
8. Design at least 10 test cases for each module.
9. -10: Code and test the project, which you have designed in last 8 labs.

Vivekananda Global University, Jaipur

Semester III

BCA (Computer Science & Applications)

BCA 310: INTERNET & WEB PROGRAMMING LAB

0L+0T+4P+2C

MM: 100

1. INTRODUCTION TO HTML: What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks
, HTML Tags.

2. INTRODUCTION TO CASCADING STYLE SHEETS: Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling(Background, Text Format, Controlling Fonts),Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding, Properties, Margin properties) , CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Color, Creating page Layout and Site Designs.

3. INTRODUCTION TO PHP: Basics of PHP, PHP tags, connectivity with MySQL database, embedding of PHP tags in HTML

4. INTRODUCTION TO WORDPRESS: development in wordpress press environment, wizard , Installation, Configure wordpress: Using the WordPress dashboard ,Managing content in the WordPress dashboard, Types of users, The WordPress settings panel, Reading and writing settings, Permalinks and RSS feeds, Creating and managing posts, Setting up post categories, Creating and managing pages, Managing comments,Installing and updating plugins, Customising WordPress themes, WordPress theme options

5. INTRODUCTION TO WEB PUBLISHING OR HOSTING: Local server hosting, hosting on web, cpanel, file transfer

6. SEARCH ENGINE OPTIMIZATION: concepts of SEO, Web analytical tools , google dorks

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Semester III

BCA (Computer Science & Applications)

MGT 203: FOUNDATION PROGRAM IN ENTREPRENEURSHIP

0L+0T+2P+1C

MM: 100

Objective : This program will acquire the students with the skills required to take an idea to market.

Module I : Customer Development and Experience , understanding consumer behavior and needs , designing the product/service according to the market needs , how to create an experience and not just a service.

Module II: Project Formulation – Steps involved in setting up a Business, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal.

Module III: Small, Medium And Large Industrial Sectors, Industrial Potential, Demand And Resource Based Industries, Service Sector, corporate entrepreneurship, entrepreneurship and technocrat entrepreneurship.

Module IV: Sources of finance for enterprises, angel investors and venture capitalists, banks and government institutions, policies for start-ups.

Module V.: Stakeholders Validation – test angel investor interest in the solution, pitching to others (investors, partners, potential key hires) , obtaining seed funding and making the first key hires , validate interest for partners , channels.

References: Online courses through MOOC.

1. Tendon ,C: Environment and Entrepreneur; Cliugh Publications, Allahabad.
2. Siner A David: Entrepreneurial Megabooks; John Wiley and Sons, New York.
3. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.
4. Prasanna Chandra: Project Preparation, Appraisal, Implementation; Tata McGraw Hill. New Delhi.
5. Paudey I.M: Venture Capital - The Indian Experience; Prentice Hall of India. New Delhi
6. Holt: Entrepreneurship-New Venture Creation; Prentice Hall of India. New Delhi
7. World Bank Development report 2015-16.
8. World Bank “doing Business” 2014, 2015, 2016.
9. Govt. of India “Economic survey 2015-16”, Oxford University Press
10. UNDP-Human Development Report 2015-16.

Semester IV

BCA (Computer Science & Applications)

BCA 401 PROGRAMMING IN JAVA

3L+0T+0P+3C

MM: 100

Module 1: JAVA - Introduction to Object Orientated Programming, Abstraction, Object Oriented Programming Principles, Features of JAVA, Introduction to Java byte code, Java Virtual machine.

PROGRAM ELEMENTS: Primitive data types, variables, assignment, arithmetic, short circuit logical operators, Arithmetic operators, bit wise operators, relational operators, Boolean logic operators, the assignment operators, operator precedence, Decision and control statements, arrays.

Module 2: CONTROL STATEMENTS - Java's Selection Statements, if statement, switch statement, Iteration Statements, while, do-while, for, for-each, Nested Loops, Jump Statements, Using break, Using continue, return.

Module 3: OBJECTS AND CLASSES - Objects, constructors, returning and passing objects as parameter, Nested and inner classes, Single and Multilevel Inheritance, Extended classes, Access Control, usage of super, Overloading and overriding methods, Abstract classes, Using final with inheritance.

PACKAGE AND INTERFACES: Defining package, concept of CLASSPATH, access modifiers, importing package, Defining and implementing interfaces.

Module 4: STRING HANDLING - String constructors, special string operations, character extraction, searching and comparing strings, string Buffer class.

EXCEPTION HANDLING: Exception handling fundamentals, Exception types, uncaught exceptions, try, catch and multiple catch statements. Usage of throw, throws and finally .FILE HANDLING: I/O streams, File I/O.

Module 5: CONCURRENCY - Processes and Threads, Thread Objects, Defining and Starting a Thread, Pausing Execution with Sleep, Interrupts, Joins, Synchronization. APPLET: Applet Fundamentals, using paint method and drawing polygons.

Text/Reference Books:

1. Herbert Schildt: JAVA 2 - The Complete Reference, TMH, Delhi
2. Deitel: How to Program JAVA, PHI
3. U.K. Chakraborty and D.G. Dastidar: Software and Systems – An Introduction, Wheeler Publishing, Delhi.
4. Joseph O'Neil and Herb Schildt: Teach Yourself JAVA, TMH, Delhi.

BCA 402 OPERATING SYSTEM

3L+0T+0P+3C

MM:100

Module 1: INTRODUCTION - OS Concepts – Evolution of OS, OS Structures- Kernel, Shell, General Structure of MSDOS, Windows 2000, Linux. Introduction- UNIX and ANSI Standards: The ANSI C Standard, The ANSI/ISO C++ Standards, Difference between ANSI C and C++, The POSIX Standards. In introduction and need of operating system, layered architecture/logical structure of operating system, Type of OS, operating system as resource manager and virtual machine, OS services, BIOS, System Calls/Monitor Calls, Firmware- BIOS, Boot Strap Loader.

Module 2: PROCESS MANAGEMENT - Process & Threads – Process States - Process Control Block. Process Scheduling – Operations on Processes, Threads, CPU Scheduler – Preemptive and Non-Preemptive; Dispatcher, Scheduling Criteria, Scheduling Algorithms – Process Management in UNIX.

UNIX Processes - The Environment of a UNIX Process: Introduction, main function, Process Termination, Command-Line Arguments, Environment List, Memory Layout of a C Program, Shared Libraries, Memory Allocation, Environment Variables, setjmp and longjmp Functions, getrlimit, setrlimit Functions, UNIX Kernel Support for Processes. Process Control

Module 3: PROCESS SYNCHRONIZATION - Concurrent Processes, Co-operating Processes, Precedence Graph, Hierarchy of Processes, Critical Section Problem. Two process solution, Synchronization Hardware, Semaphores – Deadlock- detection, handling, prevention, avoidance, recovery, Starvation, Critical Regions, Monitors, Inter process communication.

Memory Management - Objectives and functions, Simple Resident Monitor Program (No design), Overlays – Swapping; Schemes – Paging – Simple, Multi-level Paging; Internal and External Fragmentation; Virtual Memory Concept, Demand Paging - Page Interrupt Fault, Page Replacement Algorithms; Segmentation – Simple, Multi-level, Segmentation with Paging, Memory Management in UNIX.

Module 4: INTER PROCESS COMMUNICATION:- 1.Virtual Memory– Concept, virtual address space, paging scheme, pure segmentation and segmentation with paging scheme hardware support and implementation details, memory fragmentation, 2: Overview of IPC Methods, Pipes, popen, pclose Functions, Coprocesses, FIFOs, System V IPC, Message Queues, Semaphores. Interprocess Communication – 3: Shared Memory, Client-Server Properties, Stream Pipes, Passing File Descriptors, An Open Server-Version 1, Client-Server Connection Functions.

Module 5: INFORMATION MANAGEMENT - Files and Directories – Directory Structure – Directory Implementation – Linear List - Hash Table. Device Management: Dedicated, Shared and Virtual Devices - Serial Access Devices, Direct Access Devices, Direct Access Storage Devices – Channels and Control Units – Disk Scheduling methods.

Text/Reference Books:

1. Operating Systems Concepts – Silberschatz, Galvin, Wiley Publications (2008)
2. Modern Operating Systems - Andrew S. Tenenbaum, Pearson Education Asia / PHI (2005)
3. UNIX System Programming Using C++, by Terrence Chan: Prentice Hall India, 1999.
4. Advanced Programming in UNIX Environment, by W. Richard Stevens: 2nd Ed, Pearson Education, 2005.

BCA 403: COMPUTER GRAPHICS & VISUALIZATION

3L+0T+0P+3C

MM: 100

Module 1: INTRODUCTION - History of computer graphics, applications, graphics pipeline, physical and synthetic images, synthetic camera, modeling, animation, rendering, relation to computer vision and image processing, review of basic mathematical objects (points, vectors, matrix methods)

Module 2: INTRODUCTION TO OPENGL - OpenGL architecture, primitives and attributes, simple modeling and rendering of two- and three-dimensional geometric objects, indexed and RGB color models, frame buffer, double buffering, GLUT, interaction, events and callbacks, picking.

Module 3: GEOMETRIC TRANSFORMATIONS - Homogeneous coordinates, affine transformations (translation, rotation, scaling, shear), concatenation, matrix stacks and use of modelview matrix in OpenGL for these operations. Viewing - Classical three dimensional viewing, computer viewing, specifying views, parallel and perspective projective transformations; Visibility- z-Buffer, BSP trees, Open-GL culling, hidden-surface algorithms.

Module 4: SHADING - Light sources, illumination model, Gouraud and Phong shading for polygons. Rasterization- Line segment and polygon clipping, 3D clipping, scan conversion, polygonal fill, Bresenham's algorithm. Discrete Techniques- Texture mapping, compositing, textures in OpenGL; Ray Tracing- Recursive ray tracer, ray-sphere intersection

Module 5: REPRESENTATION AND VISUALIZATION - Bezier curves and surfaces, B-splines, visualization, interpolation, marching squares algorithm

Text / Reference Books:

1. Edward Angel, Interactive Computer Graphics. A Top-Down Approach Using OpenGL (fifth Edition), Pearson Education, 2008
2. Donald Hearn and Pauline Baker, Computer Graphics with OpenGL (third edition), Prentice Hall, 2003
3. F. S. Hill Jr. and S. M. Kelley, Computer Graphics using OpenGL (third edition), Prentice Hall, 2006
4. Peter Shirley and Steve Marschner, Computer Graphics (first edition), A. K. Peters, 2010

BCA 404: LINUX & SHELL PROGRAMMING

3L+0T+0P+3C

MM: 100

Module 1: INTRODUCTION: Logging in, changing password (passwd command only), man, xman, info commands to access on line help. Simple commands like ls, cp, mv, grep, head, tail, sort, uniq, diff, echo, date, which, whereis, whatis, who, finger w (option and variations included). Directory commands, access permissions, changing access permissions for files and directories, hard & symbolic links. Environment and path setting

Module 2: VI EDITOR: Creating and editing files, features of vi, insertion deletion, searching, substitution operations, yank, put, delete commands, reading & writing files, exrc file for setting parameters, advance editing techniques. vim(improved vi).

Module 3: INTRODUCTION TO X-WINDOW SYSTEM: x-window as client/ server system, concept of window manager, remote computing & local displays, xinitrc file, customize X work environment and applications, customizing the fvwm window manager.

Module 4: SHELL: Meaning and purpose of shell, Introduction to types of shell. The command line, standard input and standard output, redirection, pipes, filters special characters for searching files and pathnames. Bourne Again SHell: shell script-writing and executing, command separation & grouping, redirection, directory stack manipulation, processes, parameters & variables, keyword variables

Module 5: SHELL PROGRAMMING: Control structures, the Here document, expanding NULL or USET variables, Builtins, functions, history, aliases, job control, filename substitution. source code management- RCS and CVS. awk utility

Text/References Books :

1. A practical Guide to Linux, Sobell, Pearson.
2. A Practical Guide to Linux Commands, Editors, and Shell Programming, Sobell, Pearson.
3. A Practical Guide to Fedora and Red Hat Enterprise Linux, Sobell, 5e, Pearson
4. Harley Hahn: Guide to Unix & Linux, TMH

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Semester IV

BCA (Computer Science & Applications)

BCA 405: CLOUD COMPUTING

3L+0T+0P+3C

MM: 100

Module 1: INTRODUCTION - Shift from distributed computing to cloud computing; principles and characteristics of cloud computing- IaaS, PaaS, SaaS; service oriented computing and cloud environment

Module 2: CLOUD COMPUTING TECHNOLOGY - Client systems, Networks, server systems and security from services perspectives; Accessing the cloud with platforms and applications; cloud storage

Module 3: WORKING WITH CLOUD- INFRASTRUCTURE AS A SERVICE – conceptual model and working Platform as a Service – conceptual model and functionalities Software as a Service – conceptual model and working Technologies and Trends in Service provisioning with clouds

Module 4: USING CLOUD SERVICES - Cloud collaborative applications and services – technology, applications and case studies with calendars, schedulers and event management; cloud applications in project management.

Module 5: CASE STUDIES - Microsoft Azure, Google App Engine and Open source clouds- Open-Nebula and Eucalyptus , Current trends and research

Text / Reference Books:

1. Anthony T.Velte, Toby J.Velte and Robert E, Cloud Computing – A Practical Approach, TMH , 2010
2. Michael Miller, Cloud Computing – Web based Applications, Pearson Publishing, 2011

Module 1: INTRODUCTION - What is intelligence? Foundations of artificial intelligence (AI). History of AI; Problem Solving- Formulating problems, problem types, states and operators, state space, search strategies.

Module 2: INFORMED SEARCH STRATEGIES - Best first search, A* algorithm, heuristic functions, Iterative deepening A*(IDA), small memory A*(SMA); Game playing - Perfect decision game, imperfect decision game, evaluation function, alpha-beta pruning

Module 3: REASONING - Representation, Inference, Propositional Logic, predicate logic (first order logic), logical reasoning, forward chaining, backward chaining; AI languages and tools - Lisp, Prolog, CLIPS. Planning- Basic representation of plans, partial order planning, planning in the blocks world, hierarchical planning, conditional planning, representation of resource constraints, measures, temporal constraints

Module 4: UNCERTAINTY - Basic probability, Bayes rule, Belief networks, Default reasoning, Fuzzy sets and fuzzy logic; Decision making- Utility theory, utility functions, Decision- theoretic expert systems.

Module 5: INDUCTIVE LEARNING - decision trees, rule based learning, current-best-hypothesis search, least-commitment search, neural networks, reinforcement learning, genetic algorithms; Other learning methods - neural networks, reinforcement learning, genetic algorithms. Communication - Communication among agents, natural language processing, formal grammar, parsing, grammar

Text / Reference Books:

1. Stuart Russell and Peter Norvig. Artificial Intelligence – A Modern Approach, Pearson Education Press, 2001.
2. Kevin Knight, Elaine Rich, B. Nair, Artificial Intelligence, McGraw Hill, 2008.
3. George F. Luger, Artificial Intelligence, Pearson Education, 2001.
4. Mils J. Nilsson, Artificial Intelligence: A New Synthesis, Morgan Kauffman, 2002.

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Semester IV

BCA (Computer Science & Applications)

BCA 407: BIG DATA & HADOOP

3L+0T+0P+3C

MM: 100

MODULE 1: INTRODUCTION TO BIG DATA: Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

MODULE 2: INTRODUCTION HADOOP: Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map Reduce - Data Serialization.

MODULE 3: HADOOP ARCHITECTURE : Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., Name Node, Secondary Name Node, and DataNode, Hadoop Map Reduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

MODULE 4: HADOOP ECOSYSTEM AND YARN: Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features- Name Node High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

MODULE 5: HIVE AND HIVEQL, HBASE : Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Sub queries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

References & Text Books:

1. Professional Hadoop Solutions, Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Wiley.
2. Understanding Big data, Chris Eaton, Dirk deroos et al. , McGraw Hill, 2012.
3. HADOOP: The definitive Guide, Tom White, O Reilly 2012.
4. Big Data Analytics with R and Haoop, Vignesh Prajapati, Packet Publishing 2013.
5. Oracle Big Data Handbook, Tom Plunkett, Brian Macdonald et al, Oracle Press, 2014.

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Semester IV

BCA (Computer Science & Applications)

BCA 408: ADVANCE DATA STRUCTURES

3L+0T+0P+3C

MM: 100

Module 1: ADVANCED TREES - Definitions Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red- Black Trees. Augmenting Red-Black Trees to Dynamic Order Statistics and Interval Tree Applications. Operations on Disjoint sets and its union-find problem Implementing Sets. Dictionaries, Priority Queues and Concatenable Queues using 2-3 Trees.

Module 2: MERGEABLE HEAPS - Merge able Heap Operations, Binomial Trees Implementing Binomial Heaps and its Operations, 2-3-4. Trees and 2-3-4 Heaps. Amortization analysis and Potential Function of Fibonacci Heap Implementing Fibonacci Heap. SORTING NETWORK: Comparison network, zero-one principle, bitonic sorting and merging network sorter.

Module 3: GRAPH THEORY DEFINITIONS - Definitions of Isomorphic Components. Circuits, Fundamental Circuits, Cut-sets. Cut-Vertices Planer and Dual graphs, Spanning Trees, Kuratovski's two Graphs.

Module 4: GRAPH THEORY ALGORITHMS - Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph and Planarity Testing, Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms

Module 5: NUMBER THEORITIC ALGORITHM - Number theoretic notation, Division theorem, GCD recursion, Modular arithmetic, Solving Linear equation, Chinese remainder theorem, power of an element, RSA public key Crypto system, primality Testing and Integer Factorization.

Text/Reference Books:

1. Coreman, Rivest, Lisserson, : "Algorithm", PHI.
2. Motwani and Raghavan "Randomized Algorithms", Cambridge University Press
3. Preparata and Shamos "Computational Geometry", Springer Verlag
4. Mehlhorn "Data Structures and Algorithms: 1, Searching and Sorting", Springer Verlag EATCP
5. Monograph on Theoretical Computer Science

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Semester IV

BCA (Computer Science & Applications)

BCA 409 : LINUX & SHELL PROGRAMMING LAB

0L+0T+4P+2C

MM : 100

1. Installation of Linux, Virtual machine & live cd.
2. Introduction to Linux/Unix Commands.
3. Simple shell script for basic arithmetic and logical calculations.
4. Shell scripts to check various attributes of files and directories.
5. Shell scripts to perform various operations on given strings.
6. Shell scripts to explore system variables such as PATH, HOME etc.
7. Shell scripts to check and list attributes of processes.
8. Execution of various system administrative commands.
9. Write awk script that uses all of its features.
10. Write a shell script to display list of users currently logged in.
11. Write a shell script to delete all the temporary files.

Semester IV

BCA (Computer Science & Applications)

BCA 410 : COMPUTER GRAPHICS LAB

0L+0T+4P+2C

MM : 100

1. Implementation of line generation using slope's method, DDA and Bresenham's algorithms.
2. Implementation of circle generation using Mid-point method and Bresenham's algorithm.
3. Implementation of ellipse generation using Mid-point method.
4. Implementation of polygon filling using Flood-fill, Boundary-fill and Scan-line algorithms.
5. Implementation of 2D transformation: Translation, Scaling, Rotation, Mirror Reflection and Shearing (write a menu driven program).
6. Implementation of Line Clipping using Cohen-Sutherland algorithm and Bisection Method.
7. Implementation of Polygon Clipping using Sutherland-Hodgman algorithm.
8. Implementation of 3D geometric transformations: Translation, Scaling and rotation.
9. Implementation of Curve generation using Interpolation methods.
10. Implementation of Curve generation using B-spline and Bezier curves.
11. Implementation of any one of Back face removal algorithms such as Depth-Buffer algorithm, Painter's algorithm, Warnock's algorithm, Scan-line algorithm)

Programs in JAVA:

1. Creation of classes and use of different types of functions.
2. Count the number of objects created for a class using static member function.
3. Write programs on interfaces.
4. Write programs on packages.
5. Write programs using function overloading.
6. Programs using inheritance
7. Programs using IO streams.
8. Programs using files.
9. Write a program using exception handling mechanism.
10. Programs using AWT
11. Programs on swing.
12. Programs using JDBC

Semester IV

BCA (Computer Science & Applications)

MGT 204 : INTERMEDIATE PROGRAM IN ENTREPRENEURSHIP

0L+0T+2P+1C

MM : 100

Objective : This program will teach the students about market size , costs , channels and customer acquisition , business model and plan finalization , efficiency and growth processes.

Module I : Identify the vertical for operating your business opportunity , understanding your customers and accurately assessing market opportunity , Minimum Viable Product and The Lean Method.

Module II: Developing and validating a business model for your venture – Value Proposition , Customer Segments , Channels and Partners , Revenue Model and Streams , Key Resources , Activities and Costs , Customer Relationships and Customer Development Processes.

Module III: Translate your business model into a business plan , Visioning for your venture , Taking your product/service to the market , Delivering an Investor pitch to a panel of investors.

Module IV: Identify possible sources of funding for your venture , Marketing your business – Get to Market Plan , effective ways of marketing for start ups – digital and viral marketing , hire and manage a team , Managing start up finance.

Module V : Legal and regulatory aspects for starting up your venture , Enhancing the growth process and creating scalability , thorough understanding of market size , costs , margins , delivery channels , customer acquisition costs , Key areas of BM Canvas , 1-2 year roadmap and trajectory.

References:

Online courses through MOOC.

1. Tendon ,C: Environment and Entrepreneur; Cliugh Publications, Allahabad.
2. Siner A David: Entrepreneurial Megabuks; John Wiley and Sons, New York.
3. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.
4. Prasanna Chandra: Protect Preparation, Appraisal, Implementation; Tata McGraw Hill. New Delhi.
5. Paudey I.M: Venture Capital - The Indian Experience; Prentice Hall of India. New Delhi
6. Holt: Entrepreneurship-New Venture Creation; Prentice Hall of India. New Delhi
7. World Bank Development report 2015-16.
8. World Bank “doing Business” 2014, 2015, 2016.
9. Govt. of India “Economic survey 2015-16”, Oxford University Press
10. UNDP-Human Development Report 2015-16.